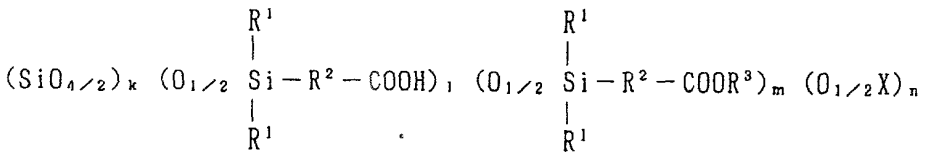
What is claimed is:

1. A silicon-containing polymer comprising the structure represented by formula 1 below as a main structural unit.



1

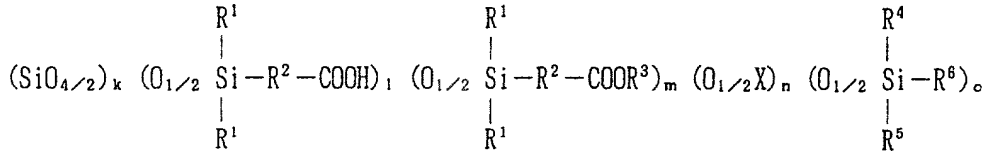
where R^1 represents a monovalent organic group, R^2 represents a direct bond or a divalent organic group, R^3 represents a monovalent organic group or an organosilyl group, any of which groups may be of different types, X represents hydrogen, a monovalent organic group or an organosilyl group, which groups may be of different types, k and l are positive integers, m and n are 0 or positive integers, and these subscripts satisfy the following relationship.

$$0 < \frac{l}{l+m+n} \leqq 0.8 \qquad 0 \leqq \frac{m}{l+m} < 0.2$$

2. A silicon-containing polymer according to claim 1, wherein at least some of the X groups are triorganosilyl groups.

3. A silicon-containing polymer according to claim 2, wherein said triorganosilyl groups include photosensitive crosslinkable groups.

4. A silicon-containing polymer according to claim 3 represented by formula 2 below, wherein said photosensitive crosslinkable group is chloromethylphenylethyl.

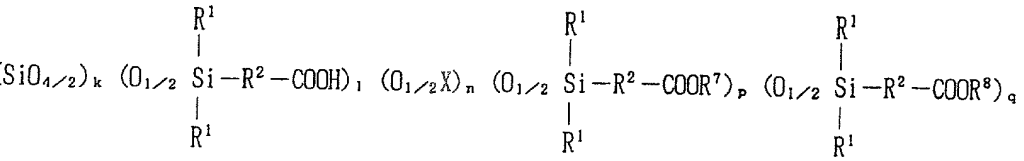


2

where R^1 represents a monovalent organic group, R^2 represents a direct bond or a divalent organic group, R^3 represents a monovalent organic group or an organosilyl group, any of which groups may be of different types, X represents hydrogen, a monovalent organic group or an organosilyl group, which groups may be of different types, R^4, R^5 and R^6 each independently represent a monovalent organic group, at least one of which is a monovalent organic group including chloromethylphenylethyl, R^4, R^5 and R^6 may be one or more different types of organic groups, k, l and o are positive integers, m and n are 0 or positive integers, and these subscripts satisfy the following relationship.

$$0 < \frac{o}{l+m+n+o} \leqq 0.8$$

5. A silicon-containing polymer comprising the structure represented by formula 3 below as a main structural unit.



3

where R^1 represents a monovalent organic group, R^2 represents a direct bond or a divalent organic group, R^7

and R^8 each independently represent a monovalent organic group or an organosilyl group, any of which groups may be of different types, X represents hydrogen, a monovalent organic group or an organosilyl group, which groups may be of different types, k and q are positive integers, l, n and p are 0 or positive integers, and these subscripts satisfy the following relationship.

$$0 \leqq \frac{l}{l+n+p+q} < 0.5 \qquad 0.1 < \frac{q}{l+n+p+q} \leqq 0.8$$

6. A silicon-containing polymer according to claim 5, wherein at least some of the X groups are triorganosilyl groups.

7. A silicon-containing polymer according to claim 5, wherein R^8 is a functional group that is eliminated by an acid catalyst.

8. A polymer according to any one of claims 1 to 7, wherein R^2 is $-(CH_2)_a-$ and a is an integer of 1-10.

9. A process for production of a silicon-containing polymer according to any one of claims 1 to 8, wherein tetraethoxysilane is used as the starting silicone monomer for formation of the polymer skeleton during production of the silicon-containing polymer, and a carboxyl group-containing compound is added that does not react with the starting silicone monomer or the resulting silicon-containing polymer in the synthesis solvent.

10. A resist composition containing a silicon-containing polymer according to any one of claims 1 to 8.

11. A resist composition according to claim 10, which further contains a photo-acid generator.

12. A resist pattern-forming method, wherein a resist composition according to claim 10 or 11 is used to form a resist layer on a working substrate, and the resist layer is subjected to light exposure and

development to form a resist pattern.

13. A resist pattern-forming method wherein a first resist material is used to form a lower resist layer on a working substrate, a second resist material is used to form an upper resist layer thereover, the upper resist layer is patterned by light exposure and development, and the lower resist layer is etched using the resulting upper layer pattern as a mask to form a resist pattern, the method comprising the use of a resist composition according to the claim 10 or 11 as said second resist material.

14. A method according to claim 12 or 13, wherein the lower layer resist is etched by oxygen-reactive ion etching (O_2-RIE).

15. A method according to claim 12 or 13, wherein a high-density plasma etching apparatus is used as the plasma etching apparatus.

16. A method for fabrication of an electronic device, comprising formation of a resist pattern by a method according to any one of claims 12 to 15.

17. A method for fabrication of a photomask, comprising formation of a resist pattern by a method according to any one of claims 12 to 15.